IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/677,212	: Confirmation No.:9635
Applicant	:	Seong Han Kim	
Filed	:	October 2, 2003	
For	:	METHOD AND COMPOSITION FOR THE CHEMICAL-VIBRATIONAL-MECHANICAL PLANARIZATION OF COPPER	
Art Unit	:	1765	
Examiner	:	George, Patricia Ann	
Docket No.	:	06324P USA	
Customer No.	:	23543	

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Joseph D. Rossi
(Type or print name of person mailing paper)

/Joseph D. Rossi/
Signature of person mailing paper

16 August 2007
Date

Affidavit Pursuant to 35 C.F.R. § 1.132

I, Seong Han Kim, declare and state that:

1. I am a co-inventor of the subject matter described and claimed in US Patent Application No. 10/677,212, titled "METHOD AND COMPOSITION FOR THE CHEMICAL-VIBRATIONAL-MECHANICAL PLANARIZATION OF COPPER".

2. I hold a Bachelor of Science degree from Yonsei University (Korea, 1990), a Masters of Science degree from Yonsei University (Korea, 1992), and a Doctorate of Philosophy degree from Northwestern University (1998). I have worked for the Korea Research Institute of Chemical Technology (1992-1993) and the University of California, Berkeley (1998-2001). Currently, I am an associate professor of Chemical Engineering at Penn State University.

3. I have extensive experience and familiarity with various topics in the field of Chemical Engineering including surface chemistry, nanomaterials, nanotribology, and catalysis. I am particularly familiar with processes for polishing semiconductor substrates.

4. I am aware of prosecution history of this application and of the Office Action mailed by the US Patent Office on May 16, 2007, including the Examiner's interpretation of the term "void volume ratio".

5. I am familiar with the Kaufman reference cited by the Examiner in the Office Action dated May 16, 2007. I understand that the Examiner interprets Kaufman as teaching a polishing slurry having a concentration of aqueous dispersion of metal oxides, comprising from about 3% to about 45% solids. Moreover, I understand that the Examiner asserts that this teaching corresponds to a slurry having a void volume ratio of about 1. However, as one skilled in the relevant art, I disagree with Examiner's assertion for the reasons provided below.

6. The Specification of the present application explains that the term "void volume ratio" means the "ratio of solution volume to the void volume of the particles". (Paragraph 0024) The "solution" of the invention comprises an etchant, modifier, surfactant, and, optionally, a solvent. (Paragraph 0026) In view of the nature of these particles and of the properties of a slurry in general, one skilled in the art at the time of the invention would readily recognize that void volume refers to the cumulative amount of space that exists between individual particles that have been assembled into a sample, e.g., a sample of particles loaded into a container. That is, the void volume is the continuous space that exists between adjacent particles loaded into container. Thus the void volume ratio is the ratio of liquid solution volume to void volume between particles.

7. By way of example, if a sample of particles were loaded into an open vessel followed by the addition of a liquid to the vessel, the liquid would flow between the particles (i.e., into the void volume) until the particles become submerged at which point all of the void space would be consumed by the liquid. In such a scenario, the void volume ratio would be 1 because the liquid volume would equal the space created between the particles. A void volume ratio of less than 1 means that a polishing mixture would not contain enough liquid solution to completely fill the space created between adjacent particles.

8. The void volume ratio of a slurry is a correlation between the volume of the slurry's liquid and the volume of space that exists between solid particles of the slurry. Thus, the void volume ratio does not correspond to the volume of the solid particles *per se*, but instead corresponds to the volume of space created between such solid particles. This volume of space is dependent upon such parameters as the geometry of the individual particles and their packing density.

9. Thus, contrary to the Examiner's interpretation of void volume ratio as meaning a correlation between the volume of a solution and the volume of solid particles in the solution, the term void volume ratio means the ratio of the volume of solution to the volume of voids existing between the particles.

10. I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and/or imprisonment under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing therefrom.

Seong Han Kim
08/07/2007

Seong Han Kim
Date